

UNION
OIL
BULLETIN

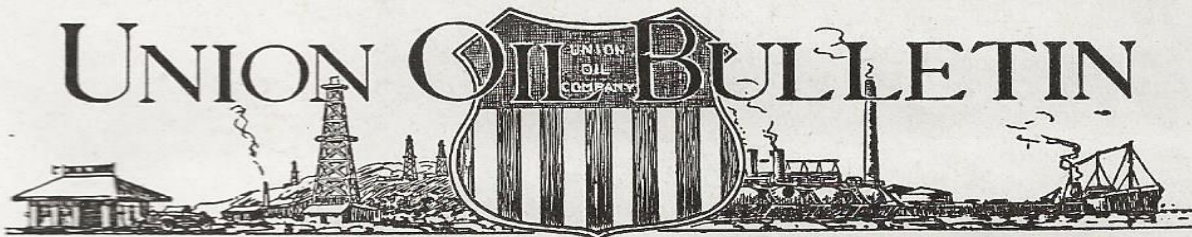
FEBRUARY 1931



Looking Down on Two Famous Washington Mountains

The above exceptional photographs of Mt. Rainier and Mt. Baker were taken by W. E. Carey, Union Oil Company aviation representative. At the top is a view, looking east, of Mt. Rainier (14,408 feet) taken from an altitude of 17,000 feet and at a distance of ten miles. A solid bank of clouds at 6,000 feet obscure its base. The center photograph of Mt. Baker, the 10,730-foot peak near Bellingham, was taken from an elevation of 15,000 feet. The Cascades appear in background. At the bottom is the summit of Mt. Rainier.

UNION OIL BULLETIN



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VOLUME XII

FEBRUARY

BULLETIN No. 2

Underground Storage of Oil and Gas

OVER a period of three years the Union Oil Company of California has successfully stored in semi-depleted oil sands on its own properties in various California oil fields, thirteen billion cubic feet of natural gas and three-quarters of a million barrels of oil. The storage of the oil has taken place during the past twelve months and is still in progress.

As far as is known, the Union Oil Company is the only company in California or elsewhere that has utilized older producing wells for the storage of oil, although other companies have stored natural gas underground. The oil thus stored, and a large percentage of the gas, has been produced in one field and carried by pipe line to another.

So far the storage of oil has been limited to two of the company's large fee holdings, the Stearns, in the Brea-Olinda field near Los Angeles, and La Purisima, in the Lompoç field. The former covers several hundred acres and the latter several thousand. The wells on both properties are shut-in, and inasmuch as there

are no lease requirements which will compel the company to produce from the wells, the oil will remain in its natural subterranean storage until such time as it is needed.

The underground storage of natural gas, which preceded the storing of oil, was first attempted by the company at Dominguez during its experiments with gas lift and repressuring methods four years ago, and proved so successful that a year later when the company desired to conserve an excessive amount of gas then being produced, it started storing gas on the Dominguez lease and has carried on the storage there more or less regularly since that date.

The company undertook its storage of oil underground about a year ago, when it was confronted with a huge flush production from the deep, high pressure wells at Santa Fe Springs after a long period of overproduction generally had virtually exhausted all available surface storage. Previous tests by the company's field department and research laboratories had convinced the officials that the storing of

oil underground, while revolutionary at the time, judged by then known standards, was entirely feasible.

The company's Stearns holdings—consisting of several hundred acres—were chosen as the first storage center. Prior to that time some 600,000,000 cubic feet of gas had been pumped in the wells on the property, all of which were then and still are shut-in. The oil was carried by pipe line direct from producing wells at Santa Fe Springs to old producers on the Stearns property that had ceased to flow. Four wells were utilized, oil being pumped into three and gas into the fourth, and in order to get equal distribution the wells receiving gas and oil were rotated. The oil was injected into the wells through the tubing under a 900-pound pressure built up by three high-pressure pipe line pumps located at the wells.

During the period of the oil injection, covering several months, a half million barrels of oil were pumped into the Stearns wells and 556,000,000 cubic feet of gas added to the 600,000,000 cubic feet previously stored in the field.

Since storing Santa Fe Springs oil and gas at Stearns, several production tests have been made, during which wells that previously produced a nominal amount of oil on the pump flowed at the rate of several hundred barrels a day. The oil pumped from Santa Fe Springs was 34 gravity, while the oil in the Stearns wells was 17 gravity. The oil produced from these wells during the recent production tests was found to be 32 gravity, proving the contentions of those who recommended the experiment that the light oil would diffuse into the heavy oil.

The production experts also point out that not only do they expect to eventually recover all the oil and gas stored underground, but that as a result of the storage of the light oil in the heavy oil zones it will be possible to recover a larger quantity of heavy oil than would have been possible under regular production methods. The reason for this, they state, is that the light oil, mixing with the heavy, will make the latter less viscous and cause it to flow more readily through the oil sands.

If a test was now made of the oil at various points in the formation, that immediately surrounding the casing of the wells, in which the light oil was injected, would be found to be approximately the same as the gravity of the oil put into the well, while that a little farther back in the formations, being more thoroughly mixed with the heavy oil, would be considerably reduced in gravity. The oil driven to the extreme recesses of the oil zone by the pressure behind the injected oil would be only slightly higher than the gravity of the oil originally produced by the well.

Pleased with the results obtained in storing oil at Stearns, the company officials four months ago approved the storage of oil, produced in the Orcutt field, in wells on the company's La Purisima property. The two fields are ten miles apart. Oil and gas are carried by pipe line from the producing Orcutt wells to the La Purisima wells. Gas has been stored in this field for a period of about a year, during which time 321,000,000 cubic feet has been injected into the wells. An excess of a quarter of a million barrels of oil has been stored to date. The La Purisima wells, prior to the gas and oil injections, were small pumpers. Under tests conducted recently they flowed at the rate of several hundred barrels a day.

The gravity of the La Purisima oil is approximately 19, while the gravity of the Orcutt oil is 22. To increase the gravity of the injected oil, natural gasoline from the Orcutt absorption plant is pumped into the pipe lines, along with the crude, bringing the combined gravity of the two up to 28.

In addition to the oil and gas being stored at La Purisima at present, the company is storing gas at Santa Fe Springs, Dominguez, Rosecrans and Richfield. The daily storage of gas in all fields totals 13,000,000 cubic feet.

The oil stored by the company has been charged against its allowable production in the fields in which it has been produced in accordance with curtailment schedules. Royalties are paid to the lessors for the oil the same as if it had been stored above ground.

Awards for Valor

ACTING on the recommendation of the Safety Board (made up of the managers of the operating departments of the company) the Executive Committee of the Board of Directors recently passed a resolution commending the actions of nine company employees. As an expression of its appreciation the company has placed to the personal credit of each of these men in the Provident Fund, the sum of five hundred dollars.

In its letter of recommendation, the Safety Board states that "the principle on which we make these recommendations is that recognition should be given to employees who, beyond the accepted line of duty and at the unquestioned risk of their own lives, attempt to save life or major property loss."

Five of the awards are for heroic action at the time of the fire on the S. S. Warwick, which claimed the lives of four members of the crew, destroyed the crew's quarters, and threatened the destruction of the tanker. The start of the fire was apparently in the crew's quarters, though no conclusive proof of how the fire started was adduced by the investigating committee. There was no question, however, about the seriousness of the situation. Within a moment after its start the after-quarters were ablaze and one member of the crew, who ran nearly the length of the ship, had set fire to the cargo tanks with his burning garments. The combined effort of the shore crew and the Los Angeles Fire Department soon had the fire on the ship under control. Four of the crew, injured during the blaze, did not survive their burns. That the list is no greater was largely due to the splendid work done by the men who boarded the ship at the height of the fire and at the risk of their own lives aided those on board.

The men cited by the Safety Board for their heroism in this fire were:

"**Hans Halvorsen**, employed August 25,

1914, now port captain at Los Angeles, who on November 30, 1926, at the risk of his life boarded the SS WARWICK,



Hans Halvorsen

of which he was master, after an explosion had set fire to the ship at her berth in Los Angeles harbor, and tore the burning clothing from Boatswain W. Oxsen and Second Officer C. Sandberg, and then directed the fire fighting which saved the ship from destruction and prevented the destruction of the shiploading plant.

"**Henry Vortman**, employed September 15, 1906, now chief engineer of the SS DEROCHE, who on November 30, 1926, boarded the SS WARWICK,



Henry Vortman

of which he was chief engineer, after an explosion had set fire to the ship at her berth in Los Angeles harbor, and at the risk of his life helped extinguish the burning clothing on Boatswain W. Oxsen and Second Officer C. Sandberg and then bent his efforts to extinguishing the fire in the main cargo tanks.

"**John F. Joki**, employed October 1, 1923, now chief engineer on the SS WARWICK, who on November 30, 1926, boarded the SS WARWICK, of which he was first assistant engineer, after an explosion had set fire to the ship at her berth in Los Angeles harbor and at

the risk of his life helped extinguish the burning clothing on Boatswain W. Ox-



John F. Joki

Oxsen, Marquez, Nejar and Alias, burned in the explosion on the SS WARWICK,



H. E. Kemp

men who might have been overcome or injured.

"John C. Beck, employed March 17, 1911, wharf superintendent, shiploading plant, Los Angeles, who on November 30, 1926, mobilized the fire fighting forces



John C. Beck

of the company and the city which made possible the extinguishment of the fire on the SS WARWICK and who boarded the burning vessel at the risk of his life and directed his men in extinguishing the fire which was burning in the

after quarters and at the hatches of the cargo tanks." "H. E. Kemp, employed October 11, 1916, now chief clerk, Marine Department, who on November 30, 1926, rendered first aid to Sandberg, employed on November 30, 1926, rendered first aid to Sandberg, and rescued J. Santateresa, blown from the vessel into the harbor, and at the risk of his life secured from the officers' quarters on the burning vessel blankets used in applying foam to the hatches of the cargo tanks and also inspected the after quarters of the ship for any

men who might have been overcome or injured.

and at the hatches of the cargo tanks."

Two fires at Los Angeles refinery brought to the attention of the management the actions of three men, who risked their own lives to save the lives of their fellow employees. Fire originating in a temporary construction lighting circuit caused the ignition of a kerosene agitator in the early hours of the morning. Several men handling clay used in treating the kerosene were caught on the working platform of the agitator which is a tower-like structure 35 feet in height. Although escape slides are provided on the agitators in addition to the usual steel stairway, in the confusion following the flash one man was trapped on the loading platform. The foreman, T. M. Phillips, was seared, but in spite of his own burns he stood by his men and brought the more seriously injured out of the fire. For this action the following citation was made by the Safety Board:

"T. M. Phillips, employed August 18, 1919, Cross Plant foreman, who on July 9, 1927, after an explosion in agitator No. 3 at Los Angeles refinery in which he himself was burned, disregarded his own injuries, and at the risk of his life, rescued James Shepherd, who had been dazed and whose clothing had been set on fire by the explosion."



T. M. Phillips

At the other Los Angeles refinery fire only one man was actually caught in the explosion which occurred in the pump room of the treating plant. As nearly as can be ascertained this fire started from an oil immersed electric starting switch on a large pump, a piece of apparatus assumed at that time to be safe for use in even explosive atmospheres. The pump operator was caught in the explosion and so badly injured that he could not escape from the building. With no other protection than the stream from a small portable extinguisher, two men crawled along the

floor of the burning building and brought out the injured man. For this action the following citation was made:

"**Vernon Taylor**, employed December 11, 1917, plant foreman at Los Angeles refinery, and **Leslie Vancil**, employed June 16, 1924, now head treater at Los Angeles refinery, at the risk of their lives, entered the burning basement of the South Clay Storage building and helped rescue John Coyne who had been fatally injured in the original explosion and lay in the rear of the room with his clothing on fire."



Vernon Taylor

The most recent of the nine acts of heroism for which awards have been made took place in the hectic days of the second Santa Fe Springs boom. A large well had just been placed on production from one of the newly discovered deep zones. Much gas and some water was being produced along with the oil, all under extremely high pressure. In order to separate the oil, gas and water, various traps had been placed "on stream." It was late on a Sunday afternoon when the second water trap was put into service. Recognizing the danger of mechanical failure and the possibility of fire, the men in charge,



Leslie Vancil

all of whom were superintendents or foremen, handled the actual opening of valves and watched the behavior of the apparatus. With no warning an explosion suddenly disrupted the mechanism and with terrific violence hurled one of the foremen, Wilfred Kruyer of the Gas Division, under the floor of the derrick. Released of its control, the well started to

roar its way to freedom, flooding the congested neighborhood with highly flammable gas and oil. Into this situation stepped Frank C. Boyd, assistant superintendent of drilling, who soon brought the well under control, although almost unconscious from gas before the task was completed. The citation from this action was as follows:

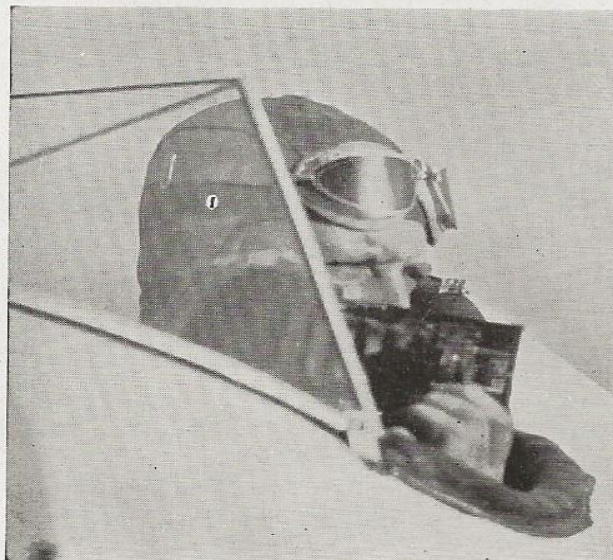
"**Frank C. Boyd**, employed September 12, 1913, now drilling foreman, Santa Fe Springs, who on December 30, 1928, at the risk of his life from asphyxiation, failure of equipment and fire, entered the derrick of Alexander Well No. 14 at Santa Fe Springs and shut in the well which was running wild. In doing so he made possible the rescue of Wilfred Kruyer



Frank C. Boyd

who had been hurled, mortally wounded, under the derrick floor, and prevented a disastrous fire."

Sky Photography His Hobby



W. E. Carey, whose aerial photographs, taken with an ordinary kodak, have many times graced the columns of the Bulletin, is here shown snapping a picture from his plane.

Oil Burners of North Pacific

Dr. Ray W. Clough

Chemist, Northwest Branch, National Cannery Association, Seattle

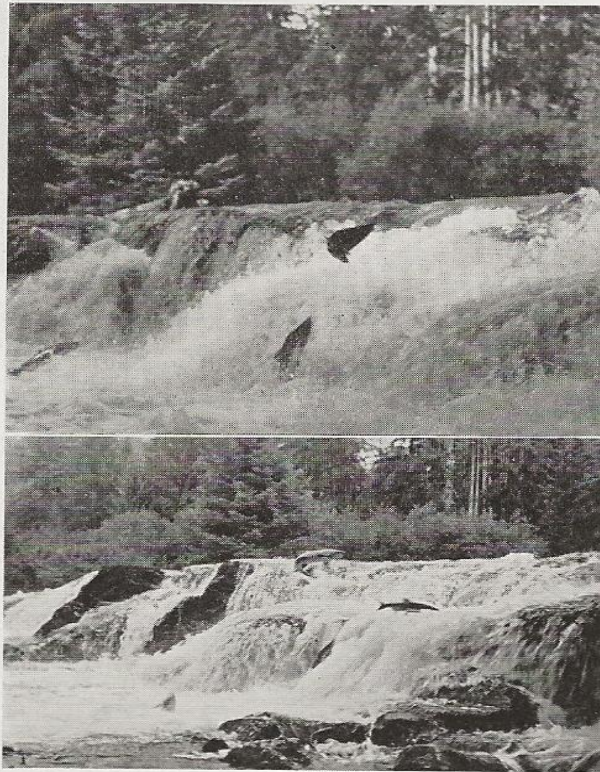
IT is early summer on the Yukon; the melting snows on a thousand mountains send innumerable streams leaping down precipitous slopes and winding through interminable plains to join the mighty river; hundreds of lakes, unlocked from icy fetters, make their lavish contributions; and the accumulating flood sweeps westward, racing through narrow canyons of the Upper Ramparts, flowing more sedately through the many winding, ever-changing channels of the broad Yukon Flats, gathering again to hurry through the Lower Ramparts, and then flowing more quietly but resistlessly through wide valleys to destroy old sandbars and build new ones in the great Yukon Delta and, finally, to discolor Bering Sea for many miles with its heavy load of silt. Beginning with the junction of the lake-born Lewis and Pelly Rivers, it absorbs the Stewart, Porcupine, Tananna, Koyokuk and Innoko, each a splendid river in itself, to form one of the world's great river systems draining an empire of 330,000 square miles.

Up from unknown ocean pastures, obeying the mysterious but imperative call of nature, led by a subtle sense of direction, come thousands of silvery salmon bound for some clear stream or lake in the headwaters of the Yukon sys-

tem, there to place their eggs and, worn out from their exertions, to die and complete the cycle of their life. As they come in from the sea they are regal creatures, bright and shiny, full of life and vigor, with rich fat distributed all through their bodies, a splendid food for a king's own table! But as they lie spent, feebly quivering, on some distant sandbar, they are lusterless, scarred and emaciated. Why this great change in the course of two or three months?

By some provision of nature, these fish, which have been voracious feeders since, as tiny fry, they first darted forth from among the pebbles to wage ruthless war on all other forms of life suitable for their food, lose all interest in eating as soon as they enter fresh water on their final migration and live but for one purpose, the reproduction of their kind. And so it is from the stored-

up fat within their tissues that the energy necessary for their laborious journey to the headwaters, a distance in some cases of over 2000 miles, is drawn. They are, in effect, oil-burners, and very efficient ones! Our average of analyses of the Yukon king salmon during three consecutive years reveals that their bodies contain an average of 18.25 per cent fat. During a seven weeks' period from the time the fish enters the river until it



King Salmon leaping falls to gain headwaters of Yukon—burning oil, as a motor burns fuel, during a 2000-mile trip from the ocean.

spawns and dies, it can be shown that a sixty-pound salmon expends the energy equivalent to a twentieth-horse-power engine in continuous operation. No doubt he develops more power than this in the swifter water and rests, with his engine idling so to speak, in sheltered places.

Long ago nature discovered that the most efficient way to store energy was in the form of fats and oils; thus one gram of fat can produce 9.3 calories (large) of heat or its equivalent in some other form of energy, while one gram of either carbohydrates (starches, sugars, etc.) or proteins can produce but 4.5 calories. The ten pounds or more of fat in the sixty-pound king salmon could produce some 130,000,000 foot-pounds of energy or enough to lift him to a height of over 400 miles. The salmon, being a cold-blooded animal, does not expend his stored energy for heat as is necessary with warm-blooded animals. It is hard to realize the energy locked up in fat and oil, but it is emphasized in a recent article on the migration of birds where it is stated that two ounces of fat are enough to carry the Golden Plover on his astonishing non-stop flight of 2400 miles from Nova Scotia to South America.

Russian scientists working on the Amur River salmon found that 98 per cent of the stored fat and 57 per cent of the protein (their living body-tissues) was expended in the spawning migration. Much of the protein was expended and some of the fat was used in the development of the eggs and milt, although, no doubt, some of the protein was also burned for energy. This extreme depletion of the stores of fat and protein, together with the sloughing off of parts of the disused digestive tract, makes it impossible for the Pacific salmon to go back to salt water. It is, probably, a wise provision of nature that the salmon ceases to eat in fresh water; no river, however large, could possibly furnish food for the myriads of hurrying salmon. If their appetites were as sharp there as they are in the sea they would eat up all the young fish and most of the eggs and would be likely to completely undo all their efforts at perpetuating the species.

The coming of the salmon to the Yukon

is still an occasion for great rejoicing among the natives, both Eskimo and Indian, who live near its mouth or along its banks although they are not as dependent upon them as they were before the coming of the white man. In 1867, William Dall, leader of the Scientific Corps of the Western Union Telegraph Company's expedition to survey the Yukon in an attempt to link Europe with America by land wire, wrote of the eagerness with which the natives, after the "hunger months" of spring, caught the savory fish and dried great quantities for winter use for themselves and their numerous dogs. He estimated that "not less than two million" were dried near the mouth of that river each summer and "probably double that number," while he saw spawned fish piled three or four deep in wind-rows on the banks of the Unalaklik River late in the season.

Referring to their richness, he wrote: "The Chowichee of the Yukon is the king of salmon. Laid in a little water to prevent burning at first, a slice of this fish will more than cover itself in the pan with its own fat." This high oil content explains how the "King" can make its way to the headwaters of the Pelly and Lewis rivers some 2300 miles from the sea against a considerable current.

So greatly did the Russians at the fort and trading post of St. Michaels, established near the mouth of the Yukon in 1833, esteem these salmon that a number of barrels were annually sent to the Governor at Sitka and by him even to St. Petersburg as a present to the Czar. Salmon weighing up to sixty pounds could be bought from the Indians for a single leaf of Circassian tobacco, of which they were extremely fond. Further up the Yukon they were not so abundant as near the mouth, but the Indians dried immense quantities, and even 2000 miles from the sea salmon formed one of the staple articles of their diet. All the explorers who have described their travels along this great water highway speak of the "banks red with salmon" caught, cleaned, split and hung up to dry by the Indians.

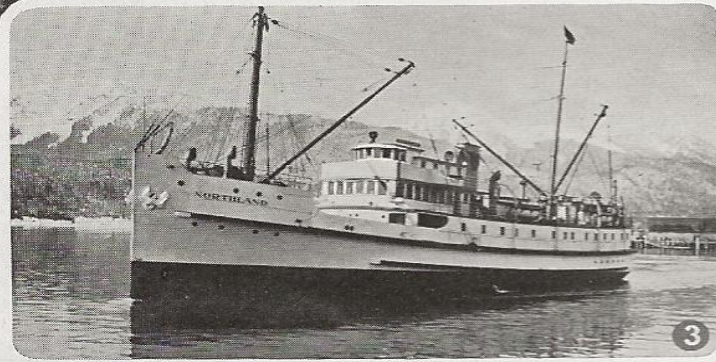
Not only throughout the mighty Yukon system, but all along the great sweep of the



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The company's Ketchikan, Alaska, marine station is shown in No. 1, with the tanker Unacana tied up at the dock to discharge supplies. No. 2 is a view of the marine service station at Juneau. In No. 3 you see beautifully appointed combination freight and passenger steamer Northland, which serves the Alaskan canning industry. She is a Diesel-driven boat and uses Union products exclusively. No. 4—A catch of salmon in a trap ready for brailing, and in No. 5, the brailing operation completed, the fish going into the vats where they are stored until reaching the cannery.

North Pacific Ocean from the Sacramento river in California, to Bering Strait and down the Asiatic Coast to Northern Japan, and as far into the interior as the salmon could fight their way along the streams, they played a prominent part in the native diet. When the white man first discovered the Columbia River, dried salmon pounded to a powder and packed in bark baskets formed an article of barter with inland Indians away from the rivers and James Swan, in a book published in 1857, describes how the Chinook Indians near the mouth of the river still carried

on this traffic, cutting the dried salmon into thin slices and placing them in baskets weighing about eighteen pounds each.

Major Frederick Schwatka, who spent the summer of 1891 in Alaska, described how the Chilkat Indians at the head of Lynn Canal near the present site of Skagway recovered the oil from the salmon and stored it for winter use.

Krashinikov, a Russian traveler, writing in 1787 of the rivers in the great Kamchatka Peninsula, said: "The fish come in from the sea in such numbers that they stop the course of the rivers . . . and

at this time the bears and dogs catch more fish with their paws than people do at other times with their nets." Since 1864, when canning started on the Sacramento River and rapidly spread up the coast (Alaska in 1878), much of this "natural wealth," this "swimming silver," has been changed into actual wealth. Last year over 10,000,000 standard cases of forty-eight one-pound cans each, requiring some 120,000,000 salmon, were packed in the North Pacific and many million more salmon were frozen, salted, dried and smoked.

What an astounding and valuable annual contribution from the rich ocean pasturage to the food resources of the bordering lands is this great migration of well-fed salmon. But the transaction is not so one-sided as one might at first think. Less spectacular and dramatic but no less real, is the daily contribution of nitrogenous substances and dissolved minerals, fertilizers in effect, made by the thousands of rivers and streams to the ocean fields that are plowed and harrowed by contending winds, warmed by a generous sun, and harvested by hardy fishermen in thousands of adventurous boats.

More and more these boats, comprising trolling, gill net, purse seine, tug boats,

cannery tenders and many other types are turning from sail and steam to oil burners, powered either with gas or Diesel engines. A picturesque and beautiful but island-studded, rock-strewn coast with narrow winding passages filled with tide rips, and bold headlands outlined with boiling surf requires dependable easily-controlled power such as only oil can give. Some of the larger passenger and freight boats serving these regions are also equipped with Diesel engines and, no doubt, others will follow. The canneries nearly all use gasoline or fuel oil for some of their operations and some use little else. Oil tankers and many permanent oil tanks now make oil readily available in many parts of Alaska. So that, during the salmon fishing season, the waters are alive with oil burning boats while overhead one hears the steady drone of airplane motors hurrying cannery men and fishery inspectors from one out-of-the-way place to another in a tenth of the time required by boat. And it is interesting to note that gold-strike rushes are now swiftly made comfortably seated in a cabin plane instead of slowly and painfully toiling over snow-choked mountain passes driving a dog team or carrying heavy loads. Oil burners are now bearing the burdens of both men and dogs.

Union Heater Oil Routs Frost

THERE are times when the selling of petroleum products is lifted from a prosaic routine to the realm of community service. Such an occasion arose in the Lindsay area, Central California, late in December, when an unexpectedly long and severe spell exhausted the reserve of orchard heater oil normally carried by the growers. Hundreds of orchard owners, as a result, were faced with the loss of their crop of Valencia oranges, then ripening on the trees.

Roland Fitton, Union Oil Company agent at Lindsay, and a former British war ace, proved equal to the occasion. He immediately wired the company's Maltha and Oleum refineries for Union heater oil on consignment, and while the oil was be-

ing rushed to Lindsay by special train he organized, with the aid of the Growers' Supply Company, all available tank trucks and vehicles that might be used temporarily to transport the oil from the train to the groves. As a result, when the first train pulled into the Lindsay station it was met by a convoy of trucks that were prepared to deliver the oil to all parts of the district with a minimum of delay. In many instances growers were completely out of oil for heating when the tank trucks arrived and in other cases only a few hours' supply remained in the orchard heaters.

Following the arrival of the first train of oil, C. S. Myer, manager of the Fresno District, who made a special trip to Lindsay, guaranteed the growers that



A four-o'clock-in-the-morning view of one of the Lindsay orchards during the height of operations to rout frost. One hundred orchard heaters kept burning in this fashion for from seven to ten hours will consume a tank car of fuel.

from then on there would be an ample supply of oil on hand as long as the emergency lasted.

The Lindsay Gazette in an article concerning the long freezing spell said: "Constant day and night service was maintained by the local Union Oil Company representatives. Roland Fitton, Lindsay agent, was on the job every minute and the service he and his office force, and the company he represents, rendered during the late emergency, has won the greatest praise from growers and all concerned." The day and night service referred to was continued over Sundays and the Christmas holidays as well. The company's office at Lindsay was open 24 hours a day until the emergency passed.

This accounts for the fact that 127 tank cars and 100 truck and trailer loads of

Union heater oil, approximately 2,175,000 gallons, were sold during the thirteen-day freeze.

"So well was the flow of oil maintained," stated the Lindsay newspaper, "that despite the burning of millions of gallons of oil, when the frost period ended storage tanks were full and ready for another attack in a few hours."

"Our Fuel Oil Department, Traffic Department, refineries and representatives in Lindsay, in addition to the Fresno District office, through fine co-ordination were able to handle the emergency in such a capable and efficient manner that we have won the admiration of the central portion of California," writes Mr. Myer, "and it has resulted in the building up of good will, the value of which is inestimable."



Scenes at Lindsay, California, Where Union Heater Oil Saved Valencias

Upper left, tank trucks awaiting supply of fuel. Upper right, Roland Fitton, left, agent at Lindsay, checking tank car deliveries with Otto Nissen, center, assistant district manager at Fresno, and C. S. Myer, manager of the district. Center, special train of Union Diesol arriving at Lindsay. The pall of smudge smoke hanging over the country gives this photograph, taken at 10 o'clock in the morning, the appearance of having been taken in a fog. The arrival of this train brought a sigh of relief from the growers, as it looked at the time as though the supply of fuel on hand would be insufficient to carry them through the night. At the bottom are two daytime views of the orchard heaters which hold ten gallons of fuel. On cold nights they consume oil at the rate of one gallon per hour.

California Aviatrices Win New Place in Air

WOMEN flyers have been steadily encroaching upon the records of the male birdmen, and Bobbie Trout and Edna May Cooper, early in January, besides setting a new world's refueling record of 122 hours and 50 minutes for women, came dangerously near the first men's refueling record established by the Question Mark. The previous women's endurance record, of which Bobbie Trout was a co-holder, was 42 hours.

The flight by Miss Trout and Miss

Cooper was far from a pink tea affair. For three of the five days they remained aloft they battled rain storms and were once forced to run to Imperial Valley to keep from being forced down by the thick weather.

During the 122 hours and 50 minutes the women flyers kept their endurance plane, "Lady Rolph," in the air they made 22 contacts, took on 1138 gallons of Union aviation gas and oil, and traveled nearly 7500 miles. During the refueling con-



No. 1—Bobbie Trout, left, and Edna May Cooper, who remained in air 122 hours 50 minutes to establish new world's refueling record for women. No. 2—Ralph De Rose, left, and Bud Hussey, the refueling crew. No. 3.—The "Lady Rolph" taking on supply of Union gasoline over Los Angeles. No. 4—Roy Harding taking news photographer aloft to photograph endurance plane. No. 5—The success of the refueling contacts depended to a considerable extent on the skill with which De Rose handled the 50-foot gasoline hose. He is shown here lowering the hose to the "Lady Rolph."

tacts the ships were never more than thirty feet apart, and frequently they were as close as fifteen feet.

There was no doubt in the minds of the observers of the flight but what the women would have remained in the air

several days longer had their engine not developed a cracked piston which forced them to land.

The flight was backed by Joseph Martin of the Joseph Martin Company, general brokers, Los Angeles.

Completes Twenty-Years' Service

ON December 22, last, E. W. Clark, Chairman of the Board of Directors, joined the ranks of 127 employees who have completed twenty years of continuous service with the Union Oil Company, a service that has been distinguished both from the standpoint of the company and the industry. However, long before he became officially connected with the company he was intrusted with the confidences of its officers, many of whose decisions were influenced by his counsel.

It was about 1901, while Mr. Clark was managing the Pacific Coast Railway's line, operating between tide water at San Luis Obispo and Los Olivos, California, that he first met W. L. Stewart, our late president, and W. W. Orcutt. Out of this meeting grew a close friendship. In the years immediately following, Mr. Stewart and Mr. Orcutt paid frequent visits to Mr. Clark at San Luis Obispo, during which there were frank exchanges of opinions concerning transportation and other problems then confronting the company.

It was during one of these visits, made shortly after their first meeting, that Mr. Clark's recommendation was followed in selection of the site of the company's present tank farm at San Luis Obispo, purchased in what is possibly one of the quickest deals ever concluded by the company. Mr. Stewart arrived late one afternoon after making a trip over that section of the country looking for a tank farm site, and informed him of his quest. Having an intimate knowledge of the entire area around San Luis Obispo, he suggested a site near the city, and the two left im-

mediately to look it over. When they returned to his home, Mr. Clark sent a wire to the owner of the property in San Jose who arrived the next morning. In a few hours the transaction was concluded.

When the company was considering a marine terminal to serve the northern fields, Mr. Stewart again consulted Mr. Clark regarding his recommendation.

"Only two terminals are feasible," Mr. Clark pointed out, "Port San Luis and Santa Barbara. If you establish your terminal at Santa Barbara you will run the risk of becoming embroiled in an endless controversy with the ocean bathers in that vicinity."

That eliminated Santa Barbara and arrangements were made at once to install facilities at Port San Luis to load tankers.

In 1904, after the discovery of the Santa Maria field, Mr. Clark obtained a right-of-way for a pipe line from the new field to San Luis Obispo over the Pacific Coast Railway's property.

The development of the Santa Maria oil field necessitated the extension of a short spur line to transport supplies to the headquarters established by the company for the field. The spur had to be named in order to enable the shippers to identify the destination of their shipments. Mr. Clark gave the spur the name of Orcutt, subsequently adopted by the town that grew up in the vicinity.

Mr. Clark still chuckles over the incident which followed the naming of the siding. Mr. Orcutt, after hearing what had been done, acquired a piece of property on what is now the south side of the main boulevard through Orcutt, and sub-



E. W. CLARK

Chairman, Board of Directors

divided it. He later showed a map of the subdivision to Mr. Clark, who after looking over it said: "Here I have named a town after you and you haven't even named a street after me." Later when the property on the north side was subdivided the owner of the tract and Mr. Orcutt joined in naming the boulevard "Clark Avenue."

Long before Mr. Clark was brought into the company, Mr. Stewart entertained the hope that at some time he might be able to induce him to accept a position. However, as close as the two were drawn together in their frequent meetings, Mr. Stewart never gave voice to this wish, nor did Mr. Clark indicate that he would consider a change. At the time he seemed pretty firmly rooted in San Luis Obispo. In addition to being manager for the Pacific Coast Railway's line, he held interests in two banks, besides several other enterprises, including the Pinal-Dome Oil Company.

John Baker, general manager in San Francisco and in charge of the company's tanker fleet, in 1905 or '06, offered Mr. Clark the managership of the fleet. Ever frank, Mr. Clark told Mr. Baker that the company couldn't afford to pay a man in that position sufficient to induce him to make the change, "and anyway," he added, "I want to settle down. I have no desire to hang my hat in Panama one day and some place in South America a week or two later."

When the company decided to run its pipe line from the San Joaquin Valley to San Luis Obispo, Mr. Stewart suggested to Mr. Clark that he get the right-of-way for it. He declined the offer, declaring that if he, a known corporation man, should go out in the field the right-of-way would cost the company more than it should pay for it. That ended the discussion concerning the right-of-way as neither Mr. Stewart nor Mr. Clark were prone to press the subject further.

Sometime later, however, in response to a telephone call from Mr. Stewart, Mr. Clark went to Los Angeles where the two men met behind locked doors. When Mr. Clark returned to San Luis Obispo it was to take over the management of the Pro-

ducers' Pipe Line, which he did on December 22, 1910, making his headquarters in San Luis Obispo.

At the very outset, Mr. Clark established policies governing the operation of the pipe line which still stand. His first order was that there would be no engineers hired, and that in the future engineers should be made from men who had come up from the ranks. New men who were hired were expected to be qualified for advancement as soon as they had gained the necessary experience. William Groundwater, now Manager of Transportation, and Lafe Todd, General Superintendent of the Northern Division, came up from the ranks under Mr. Clark's supervision.

In February, 1913, when Mr. Clark was promoted to the position of Manager of Transportation, with headquarters in Los Angeles, he issued an order forbidding the hiring of masters of vessels. The men who now captain the company's tankers have all won promotion through merit and service.

Mr. Clark is a staunch believer in rewarding loyalty and merit and his conviction is of long standing. During the twenty years he has been with the Union Oil Company, he has been known as a strict taskmaster, but he has ever been infinitely fair and patient with those putting forth a conscientious and intelligent effort.

Wm. Groundwater Punches 20-Year Time Clock

WILLIAM GROUNDWATER, Manager of Transportation, carries lightly on a pair of broad shoulders his twenty years of service with the Union Oil Company, which he completed on January 6, last. During that time he has lost none of his enthusiasm for his job, life in general, or duck hunting and golfing in particular. Nor has he lost any of his abundance of good humor or his interest in the men with whom he works. He is quick to champion the cause of any of his men who are visited by misfortune,

and no deserving employee under him has ever been denied a second chance.



Wm. Groundwater

“Bill” Groundwater growls like a bear at times; swears like a trooper at others, but he melts like an icicle in the sun when the heart is reached. He was born in Scotland and there is still a hint of the native “brr” in his speech, but there is no evidence of his ancestry when he reaches for his billfold. His generosity is in keeping with his size. He enjoys goodfellowship and knows more men outside and inside the company than any other Union Oil employee.

He is valuably representing the company in many activities related to but not officially a part of his work. He was recently re-elected a director of the Pacific American Steamship Association, the headquarters of which are in San Francisco, and is a director of the Los Angeles Steamship Association, a member of the executive committee of the Marine Service Bureau, a member of the American Committee of Lloyd's Register of Shipping, a member of the American Society of Mechanical Engineers and an honorary member of the American Society of Marine Engineers.

Mr. Groundwater's service with the Union Oil Company at the start was not what one would term auspicious. He was “fired” after working a few months on the construction of the Producers' Pipe Line at Creston. His summary dismissal from the job was not at the time considered a reflection on his work, as he enjoyed the reputation of being one of the ablest pipe line engineers in California, having for four years before been employed in pipe line work by the old Pacific Coast Oil Company. A few weeks after Mr. Groundwater received his time check, E. W. Clark took charge of the Producers'

Pipe Line and one of the first moves he endorsed was the rehiring of Mr. Groundwater, who in the meantime had gone to work for another oil company.

For two years or so after returning to the company he worked as engineer at the Creston pumping plant, and then was brought into San Luis Obispo and placed in charge of the mechanical equipment and personnel of the Producers Pipe Line. When Mr. Clark was made manager of transportation, in February, 1913, and transferred to Los Angeles, he selected Mr. Groundwater to superintend the operation of the Producers Pipe Line and the newly acquired Lompoc Pipe Line. In 1922 he was promoted to the position of assistant manager of transportation and the following year was placed in charge of the department. His leadership has been a happy one and in the past seven years he has built up an esprit de corps within the department that is a reflection of his own energy and enthusiasm.



M. L. Varner

Milt Varner is probably the youngest “twenty-year” man in the Union Oil Company. He spent his boyhood days on the Torrey lease, and obtained his first employment at the age of fifteen years on the Stearns lease. For twenty years he has worked in Southern Division fields.



C. J. O'Neill

C. J. O'Neill, for the past seventeen years wharfinger at Oleum, has spent the entire period of his twenty years' service with the company at the Northern California refinery. He worked as a teamster for a year after starting his employment, and for two years was a toolroom man and general utility worker.

Employees' Length of Service Record

December 15, 1930

Payroll	Length of Service in years						Total Over 10 Years	Total Average Working Force	Percentage Over 10 years service to Working force
	10	15	20	25	30	35			
<i>Field Department—</i>									
Northern Division (1).....	116	36	18	2	....	....	172	518	33.2%
Southern Division (2).....	261	41	16	5	....	....	323	933	34.6%
Texas	1	....	....	....	....	....	1	7	14.3%
Ventura	6	2	3	....	1	....	12	29	41.3%
Total Field	384	79	37	7	1	....	508	1,487	34.2%
<i>Manufacturing—</i>									
Avila Refinery	5	2	2	....	....	....	9	12	75.0%
Los Angeles Lub.....	10	2	....	....	....	....	12	38	31.5%
Los Angeles Refinery.....	55	8	4	....	....	....	67	671	10.0%
Maltha Refinery	7	1	1	....	....	....	9	30	30.0%
Oleum Refinery	97	31	19	2	....	....	149	651	22.8%
Santa Paula Refinery.....	6	....	....	....	....	....	6	13	46.2%
Vancouver Refinery .....	....	....	....	....	....	....	0	22	0.0%
Total Manufacturing.....	180	44	26	2	....	....	252	1,437	17.5%
<i>Sales Department—</i>									
Central Division Garage....	3	1	....	....	....	....	4	14	28.6%
Fresno	17	1	....	....	....	....	18	241	7.5%
Honolulu	1	....	....	....	....	....	1	37	2.7%
Los Angeles	30	20	....	....	....	....	50	536	9.3%
Los Angeles Garage.....	3	1	....	....	....	....	4	17	25.5%
Oakland	5	5	2	....	....	....	12	145	8.3%
Panama .....	....	2	....	....	....	....	2	15	13.3%
Phoenix	5	....	....	....	....	....	5	87	5.7%
Portland	16	8	1	....	....	....	25	364	6.9%
Sacramento	20	2	....	....	....	....	22	258	8.5%
San Diego	15	2	1	....	....	....	18	129	14.0%
San Francisco	23	9	6	....	....	....	38	257	14.8%
Seattle	22	8	3	....	....	....	33	330	10.0%
Spokane	2	....	....	....	....	....	2	138	1.4%
Vancouver	4	2	....	....	....	....	6	184	3.3%
Total Sales	166	61	13	....	....	....	240	2,752	8.7%
<i>Sales Construction—</i>									
Canada	1	....	....	....	....	....	1	10	10.0%
Central .....	....	....	....	....	....	....	....	27	0.0%
Northern	6	....	....	....	....	....	6	70	8.6%
Southern .....	....	....	....	....	....	....	....	43	0.0%
Total Sales Construct'n	7	....	....	....	....	....	7	150	4.7%
<i>Miscellaneous—</i>									
Disability	1	1	....	....	....	....	2	16	12.5%
Head Office	179	91	40	4	2	....	316	925	34.2%
L. A. Pipe Line	22	10	1	1	....	....	34	174	19.5%
Marine	15	7	4	....	....	....	26	413	6.3%
Purchasing Oleum	1	....	1	1	....	....	2	8	23.5%
Purchasing Warehouse	3	....	....	....	....	....	3	28	10.7%
Research (L.A.R.)	1	....	....	....	....	....	1	45	2.2%
Union Oil Bldg.....	2	....	....	....	....	....	2	39	5.1%
Total	229	114	51	5	2	....	401	1,648	24.3%
GRAND TOTAL (3).....	966	298	127	14	3	....	1,408	7,474	18.8%

NOTES—

- 1.—Includes Orcutt Field, Valley Field, Orcutt Gas, Producers and Lompoc Pipe Line.
- 2.—Includes Southern Division Field, Santa Fe Gas.
- 3.—These figures are Payroll and not District figures. An employee therefore on the Head Office Payroll although working regularly in an outlying district appears as a unit of the Head Office figures above.

FIFTEEN YEARS

Barron, John P.....Maltha Refinery
 Cobb, Wilbur W.....So. Division Field
 Haylett, Robert E.....Manufacturing Dept.
 Holbrook, William A.....San Francisco Sales
 Luhring, Rolla A.....Los Angeles Sales
 Resseman, Robert R.....San Francisco Sales
 Willets, Charles O.....Traffic Dept.
 Williams, Benjamin R.....Central Div. Garage

TEN YEARS

Bowers, Charles E.....So. Division Field
 Brayton, Frank.....Northern Division
 Carlile, Charles W.....Oleum Refinery
 Craddock, Aller R.....San Francisco Sales
 Farnsworth, Ralph E.....Northern Division
 Ford, Ralph G.....So. Division Gas
 Frazier, James B.....Northern Division
 Fuller, Edwin S.....Manufacturing Dept.

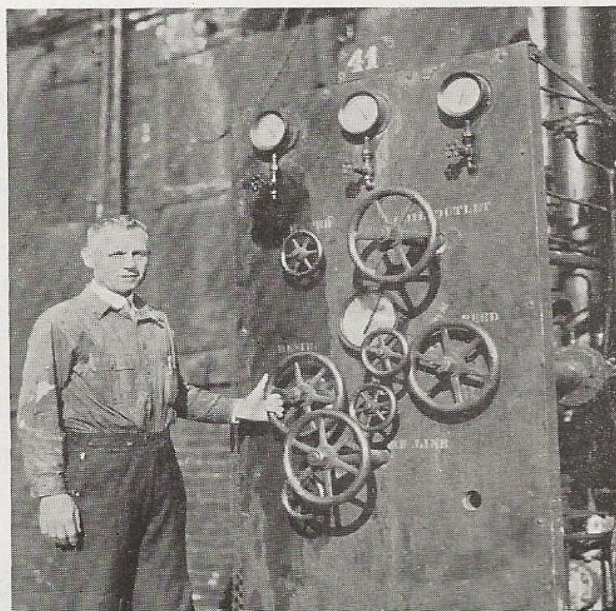
Gain, Stewart L.....Portland Sales
 Johnson, Arthur L.....Purchasing Department
 Kelley, Ivie.....So. Division Field
 Kelso, Almeron R.....So. Division Field
 Kennedy, James J.....Oleum Refinery
 Kimmons, Charles F.....So. Division Field
 Law, Roy W.....So. Division Field
 McKinley, William.....So. Division Field
 Mitcheson, Bertram M.....Los Angeles Pipe Line
 Monteith, Willard A.....Head Office Sales
 Odgers, Ethelbert.....So. Division Field
 Perry, Henry J.....Oleum Refinery
 Price, Paul E.....Avila Refinery
 Thomas, Charles F.....Oleum Refinery
 Weaver, A. R.....Northern Division
 Wilson, William M.....So. Division Field
 Winter, Henry E.....So. Division Field
 Witherow, Henry N.....Oleum Refinery
 Zimmerman, Fred.....Sacramento Sales

The Crude Oil Stillman

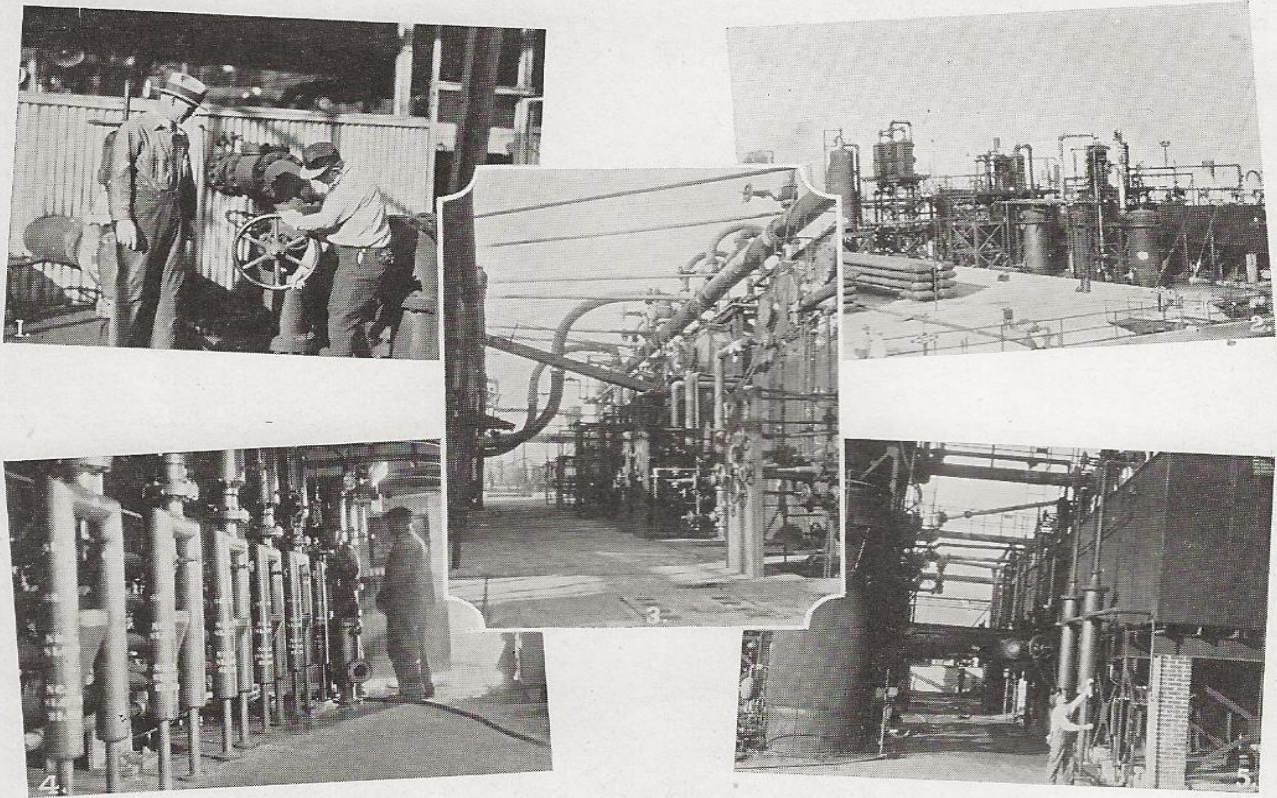
SUPERVISOR and guiding hand of the refining process by means of which original crude is split into primary gasoline, secondary gasoline, heavy gasoline, kerosene stock, gas oil and fuel oil, each of which later either constitutes the raw material for another phase of refinery operations or is directly utilized in the manufacture of a finished product, the crude stillman is to the manufacturing division of the petroleum industry what the driller is to production.

Constant vigilance and a full knowledge of the eccentricities of petroleum hydrocarbons are the largest factors in determining his varied duties. Responsibility is his from the time the storage tank valve is opened, sending the crude oil stream on its way, to the final reception of the different fractions in their respective run-down tanks. He must be alert to the slightest mishap, immediately cognizant of any change which might disrupt the flow of oil, dependent on his helpers, but always present to check their operations and offer assistance when it is essential to the maintenance of proper pressures and temperatures. Temperamental are the units under his jurisdiction, only a slight variation in the rate of feed from the storage tanks immediately affecting the temperature of the interchangers, rectifiers and condensers, all of which irregularities are magnified in the character of the finished product.

The development of a kind of sixth sense, which soon becomes a part of the stillman's being, results from his constant watchfulness over the units in his particular battery of stills, a sense that stands as a warning sentinel upon which he can rely, despite the intricate system of con-



George Murphy, crude stillman at Los Angeles refinery, standing at the control board from where valves in lines leading to and from the still may be closed or opened. Murphy's experience as a stillman dates back to the time when he was employed in the Manufacturing Department of Pinal-Dome Oil Company before it was absorbed by the Union Oil Company in 1917.



Facilities Under Stillman's Jurisdiction

In No. 1 George Murphy is seen supervising the opening of a gate valve, sending the crude from the storage tanks to primary heat interchangers. The locale of the stillman's activity is shown in No. 2. In the middle left can be seen the heat interchangers, immediately beyond which stands the primary vaporizer, with primary and secondary condensers and rectifiers grouped in the middle background. You look down the walkway between condenser boxes and a battery of stills in No. 3. A view of the control room or "tail house" is shown in No. 4. It is here that samples of the condensate, obtained in the first two cuts from the crude, are drawn off and tested for end point and gravity. To the left in No. 5 is one of the crude condensers, while to the right a stillman's helper is shown opening a chain-operated gate valve to let the first cuts into the condenser boxes.

trols and tell-tale gauges and temperature and flow charts which furnish him with a graphic picture of what is transpiring in the myriad heaters, vaporizers and condensers which form a part of each still. But, constantly on the go in his peregrinations around his particular battery of stills, adjusting a valve here and there, always endeavoring to maintain uniform operation in spite of the changing elements with which he deals, the stillman is not without his compensations and when all is running smoothly, as it is virtually all the time, would not trade positions with anyone in the refinery. Calm and assurance in himself and his men in the face of immediate or impending dan-

ger he soon learns is indispensable in the successful operation of crude stills.

While the oil is actually seen only when a sample of the condensate formed is drawn off in the control room and tested for gravity and end point, the stillman has nevertheless a mental picture of what is transpiring in the heat interchangers, vaporizers, condensers and rectifiers, and can vividly describe the many stages of the refining process. To specifically detail his duties is to tell the story of the function of crude and tubular rerun stills—of the fractional distillation process in which brownish black crude is changed to sparkling clear gasoline and the almost black residuum known as fuel oil.

Sub-Zero Journal Box Lubrication

By Walter Davis

Railroad Lubricating Engineer

AT Ogden, Utah, the main line of the Union Pacific System receives freight of all kinds for transcontinental shipment from the Pacific Northwest, from Central and Northern California and from Southern California. This fan-wise gathering of traffic then moves eastward over the 998 miles of main line tracks to Council Bluffs, Iowa, where again it radiates fan-wise to destinations northeast, east and southeast.

Highly efficient and dependable movement of trains is essential in the handling of the immense amount of tonnage which moves over the Union Pacific. Efficient lubrication is a factor of importance in this fast movement of traffic.

The average viscous car oils in service a few years ago contained fractions and ingredients which in the winter time sometimes caused the waste packing to adhere to the journals.

During the past, all journals were lubricated with a heavy summer grade during the summer weather and a lighter grade of material during the cold weather periods.

The use of summer grade car oil has been eliminated entirely on freight cars and winter oil used for this service, with the addition, during November, December, January and February of U. P. Cold Weather Car Oil, developed by the Union Oil Company, used in saturation and free oiling.

During the winter of 1928-1929 the company furnished this system many thousands of gallons of this product with many more coming up for 1930-1931.

Using this U. P. Cold Weather Car Oil, an high-speed road test over a distance of 606 miles, during which an average speed of 40 miles per hour was maintained, was conducted in August, 1929, by members of the A. R. A. lubrication committee.

The oil not only provided satisfactory lubrication throughout the run, but was responsible for a noticeable decrease in running temperatures.

There has been little or no change in this type of lubrication since the beginning. A practice on some roads was to mix signal oil, kerosene or distillate with car oils in sub-zero temperatures, to free the freezing mass from the chilled journals. This practice decreased the waste grabs and made starting trains easier, but at high temperatures the oil film was so thin that at times the metal surfaces came together with a resultant hot box. This practice germinated ideas for experimentation by certain officials: first, an expensive ice machine oil was tried as a cut back oil, used as a free oil in the boxes, with whatever other packing the box contained. Next a western neutral oil, with a very low pour test, was tried and found equally as good or better. From this it was decided to add a compound for two reasons: first, a hot box detector, second, capillarity and added primary lubrication. (This was the type oil used on the 606-mile test run.) Various tests were run on this oil in locomotive tender boxes, new turned journals, brasses and wedges used on overloaded cars, etc. More improvements were made until now the company is manufacturing the lowest pour test oil ever produced for this purpose, 75 degrees minus zero.

Cars originating on the Pacific Coast encounter temperatures anywhere from zero to 70 above in the four cold months, while those operating in the Columbia River Gorge, Idaho, Nevada, Utah, Wyoming and Nebraska encounter temperatures from zero to 60 below, making it essential to have a product which will lubricate under all these conditions and still, if called upon to work under the summer extremes, will not be found wanting.

NEWS OF THE MONTH

NEW UNION AVIATION GAS

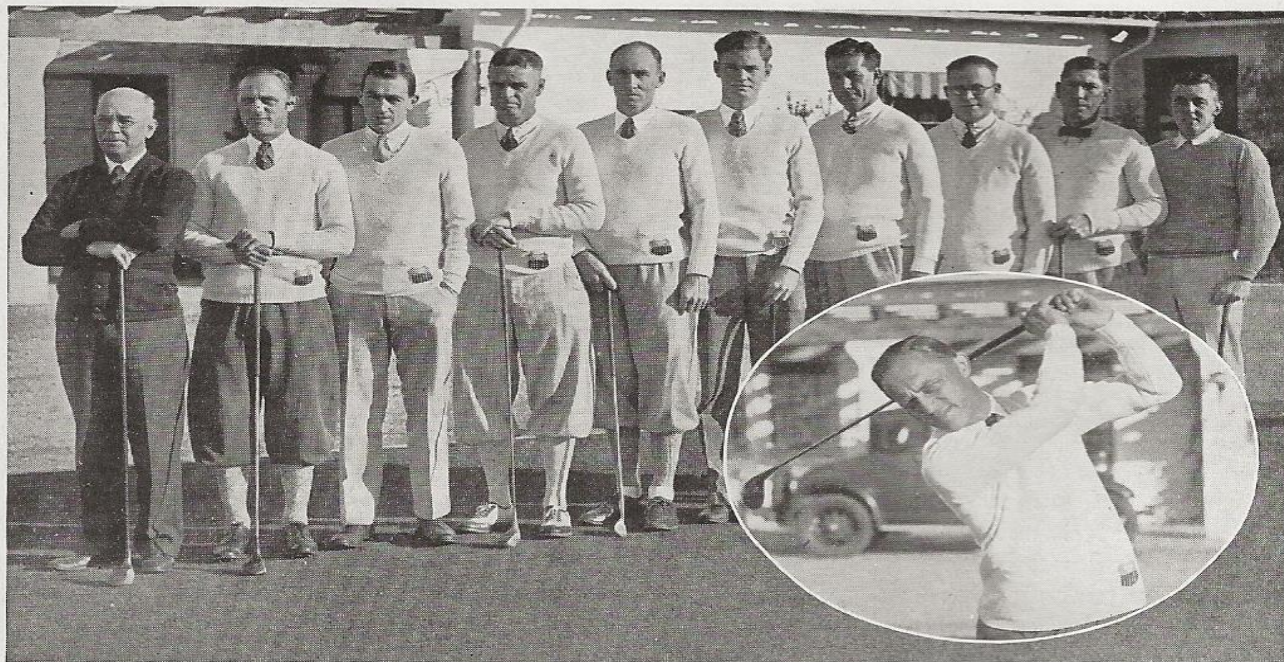
The Union Oil Company's new aviation gasoline, which was developed to meet the new drastically high specifications established by aircraft engine technicians of the U. S. Navy, is now available to all aviation gasoline consumers in the company's marketing territory.

The need for an airplane engine fuel of highest possible non-detonating quality can be attributed to the steady development toward the use of air-cooled cylinders of larger bore and higher compression. This combination produces higher temperatures in the combustion

chambers than were heretofore developed, necessitating the use of fuels of the highest possible anti-knock rating. The extreme temperatures as well as the fine alloys used in cylinder construction make it imperative that fuels also be of greatest purity, since the smallest amount of sulphur compounds when subjected to such temperatures would be destructive to metal.

In manufacturing this aviation product, the company draws the crude from the best grade of oil produced in its fields in the San Joaquin Valley. This production is especially segregated and all aviation gasoline made from it.

Union Oil Team Wins Golf Championship



Los Angeles Industrial Golf League champions for 1930 are lined up to tee off as follows: M. F. Robertson, L. I. Messinger, C. M. Nelson (manager), R. Gibbs, R. H. Hornidge, T. R. Henderson, A. S. Clarke, A. L. Anderson, E. Fields, and G. H. Gregory, while in the insert you see L. I. Messinger, captain of the team and company champion in 1930, in his follow through from a tee shot.

Scoring 23 out of a possible 28 points, the Union Oil golf team, composed of eight head office and Los Angeles district employees, last month won the championship of the Los Angeles 1930 Industrial Golf League.

In taking first place in the tournament, the

Union Oil golfers, led by L. I. Messinger, were forced to maintain an average medal score of 80 to defeat the other twenty-two teams in the league. Scoring was made on a basis of one point for each best ball. Messinger held individual honors, shooting consistently in the lower 70's.

DESERT COVER BY FROST

This month's cover of THE BULLETIN is the work of John Frost, known in art circles as the "Dean of the Desert Painters," not because of his age, but because he has painted the desert longer and more understandingly than any artist in the West. He has taken as his subject for the February cover, "Superstition Mountain," one of the land marks in the immediate vicinity of Phoenix, Arizona.

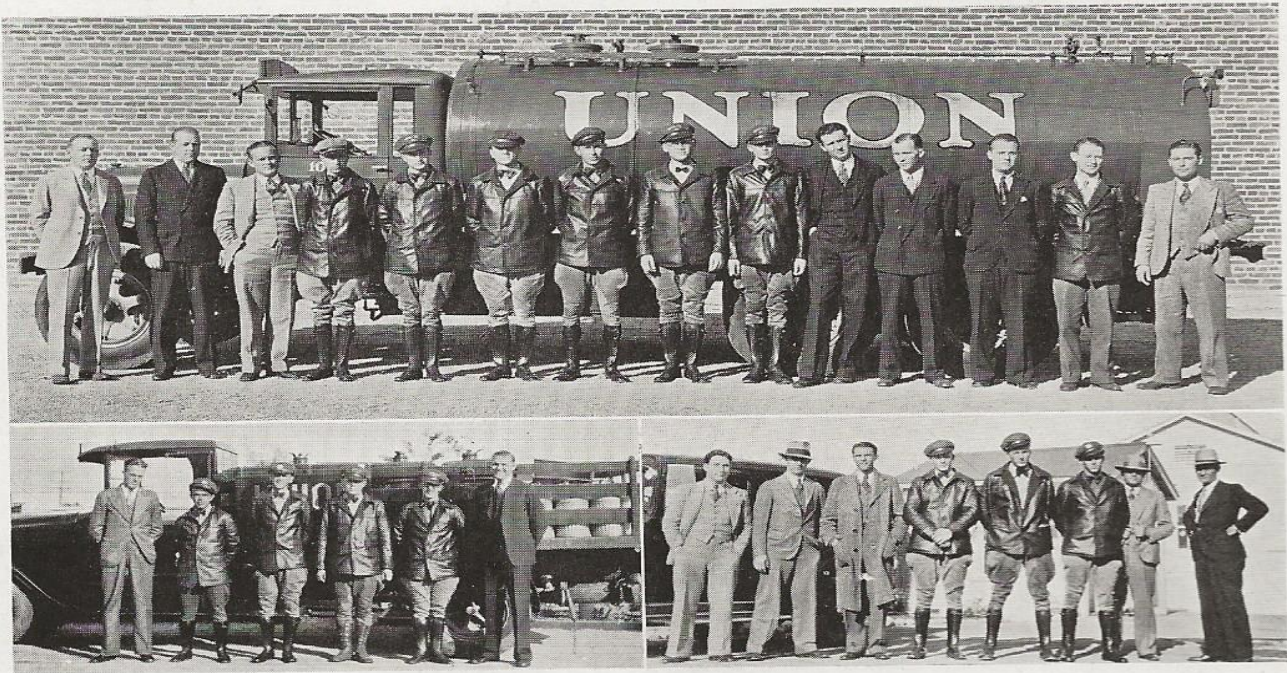
Through his long association with the desert, its every mood is known to him, and while his work possesses character and distinctive virility, he prefers—unlike many of the desert painters—the exquisite half-lights and silvery lavender tones that distinguish the desert's more delicate moods, rather than the brilliant, striking contrasts and vivid sunsets.

The son of the famous illustrator, A. B. Frost, and Emily Frost, who achieved considerable prominence as a portrait painter, it is no wonder

that as soon as he could hold a pencil, he displayed talent for drawing, and under the tutelage of his father, progressed so rapidly that as a young man, he, too, became an illustrator. Not content to follow in his father's footsteps, he came West to Arizona and California ten years ago. Though he is best known for his desert scenes, he has done portraits, marines, landscapes both real and fantastic, but in his paintings of the desert, he reveals his greatest inspiration.

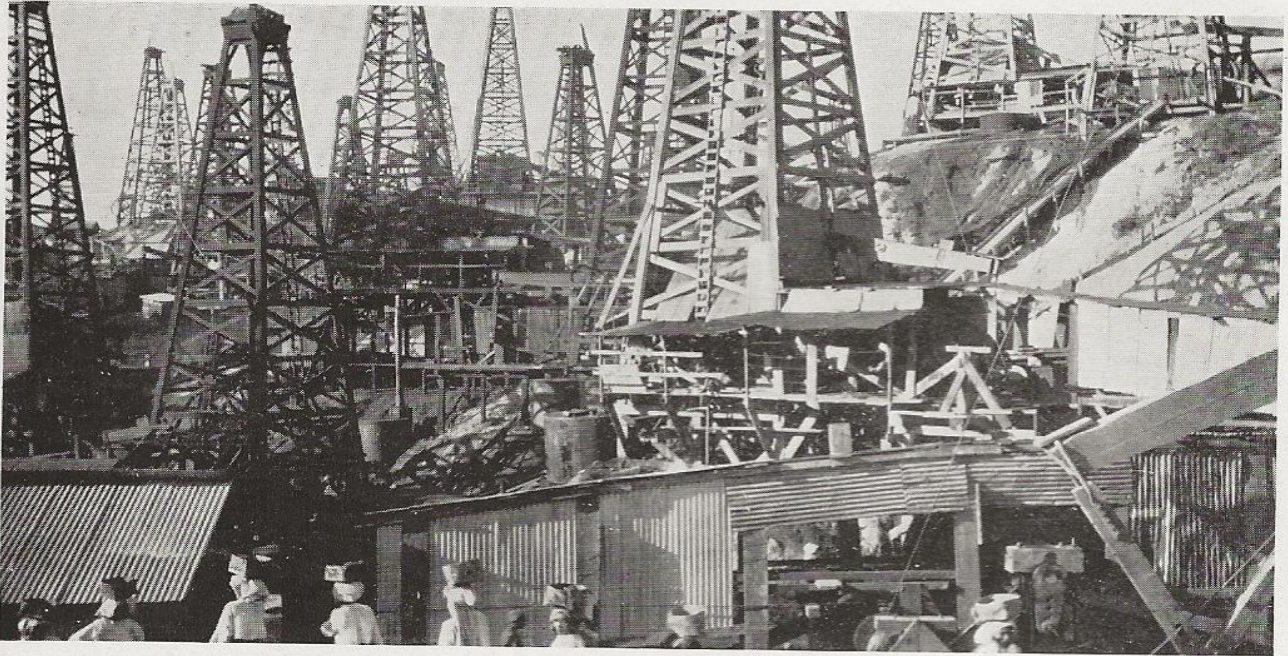
The Biographical Directory of the American Art Annual says of Frost that he was born in Philadelphia, May 14, 1890. Pupil of A. B. Frost. A member of the California Art Club; California Society of Painters and Sculptors; Pasadena Society of Artists. Awards: Honorable mention, Southwest Museum, 1921; landscape prize, Southwest Museum, Los Angeles, 1922; second prize and popular prize, Southwest Museum, 1923; gold medal, California Painters and Sculptors, 1924.

New Uniforms for Hollywood Agency



Presenting the tank truck salesmen, yardmen and warehousemen of the Hollywood Special Agency, embracing Hollywood, Culver City, and Santa Monica, in their new natty uniforms recently adopted. Also shown in the pictures are sales representatives in the various cities. The new outfits are composed of leather puttees, breeches and shirts of uniform color, leather jackets and caps on which are woven the words, "Union Oil Co." In the top photograph you see the members of the Hollywood substation, with A. L. Harmon, assistant manager Los Angeles district, standing at the extreme left; lower left is the sales personnel of the Culver City agency, while the official representatives of the company in Santa Monica are shown in the lower right.

Town-Lot Drilling in Burma Oil Fields



That Southern California is not the only petroleum-producing area confronted with the town-lot drilling problem is well illustrated in the above photograph, sent to Hugh A. Matier, Union Oil Company, by A. Beeby Thompson, advisor to the British-Burma Petroleum Company, which operates in the Yenangyaung district, Burma, where this picture was taken. The original sites of the wells were limited to 60 feet, due primarily to the fact the early wells were dug rather than drilled. In the lower part of the picture natives can be seen carrying cement to a new well in 5-gallon cans cut in half.

Moth in Union Colors



De-Haviland Moth, owned by the B. C. Air Services, which has been painted in Union Oil Company colors—orange wings, blue and white fusilage, blue rudder and white stabilizer. The partners in the company are: T. H. (Tomm) Jones, head mechanic of the Leyland Motor Company, Vancouver, B. C., and G.S. (Barney) Jones Evans, considered one of the ablest pilots in the Northwest.

BRINGS PLANE FROM PANAMA

The Lockheed plane wrecked by Capt. Roy W. Ammel at France Field, Panama Canal Zone, when he attempted to take off there on a non-stop flight to Chicago, following the completion of the first non-stop flight from New York to the Panama Canal, last month was brought to Los Angeles on board the tanker La Purisima. The wings and other portions of the plane salvaged from the wreck were transferred from the tanker to two trucks and taken to the Lockheed plant, where the plane is being rebuilt.

Capt. Ammel, who is now in Chicago recovering from injuries received in the takeoff mishap, purchased the plane from the Lockheed plant last August, and after a few test flights hopped immediately to New York where he later took off on his non-stop flight to the Panama Canal Zone, completing the second longest solo flight on record, Col. Charles Lindbergh's flight to Paris being the longest. On taking off on a proposed non-stop flight to Chicago from France Field, he struck a mud hole on the runway and nosed over

There Are More Where These Came From



W. E. Davenport, manager of the Spokane District, advises readers of the BULLETIN who enjoy fishing to spend their vacation in his district, which includes Eastern Washington and a large portion of Idaho. There are seventy-five lakes surrounding Spokane in addition to the lakes and rivers in Idaho.

J. G. Mackie, special representative of the company, is shown above holding up a string of cutthroat and Dolly Varden trout caught at Priest Lake, Idaho.

One Up on Ripley

Without in the least trying to steal any thunder from Robert Ripley and his "Believe It or Not" cartoons which appear daily in a number of newspapers on the Pacific Coast, the Bulletin is passing on to its readers knowledge of an incident in which the bow of a Union Oil Company tanker collided with the stern while it was under way. If that doesn't compare favorably with some of Ripley's unbelievable, then Ye Ed. is willing to doff his hat.

It happened like this: The company purchased two freighters which had been constructed and placed in service on the Great Lakes. These were to be converted into tankers. Each was 475 feet long, too long to transit the locks from the Great Lakes to the Atlantic, and it was necessary to cut both vessels in half. One vessel was named the Santa Rita and the other the Santa Maria. The Santa Rita was cut just forward of the amidships and forward of the navigating bridge and directly in way of a water-tight transverse bulkhead.

All of the machinery and navigating equipment remained intact in the after end of the

Union Motor Oil in Burma, India



That Union Motor Oil is making friends in the Far East is indicated by the above photograph of C. Robinson, representative of Union Oil Company's agents in Burma, India, taken on one of the northern Burma roads, which shows a one gallon can of Aristo being carried on the front of the car.

vessel, and she used her own power for maneuvering through the locks. In this way she was able to tow the forward end which was made fast to the rear of this after section. While towing through the locks it became necessary for the aft end of the vessel to stop and the forward end which was being towed behind was not checked in time and, due to headway, came up, and the bow of the boat struck its own stern, staving in a number of plates.

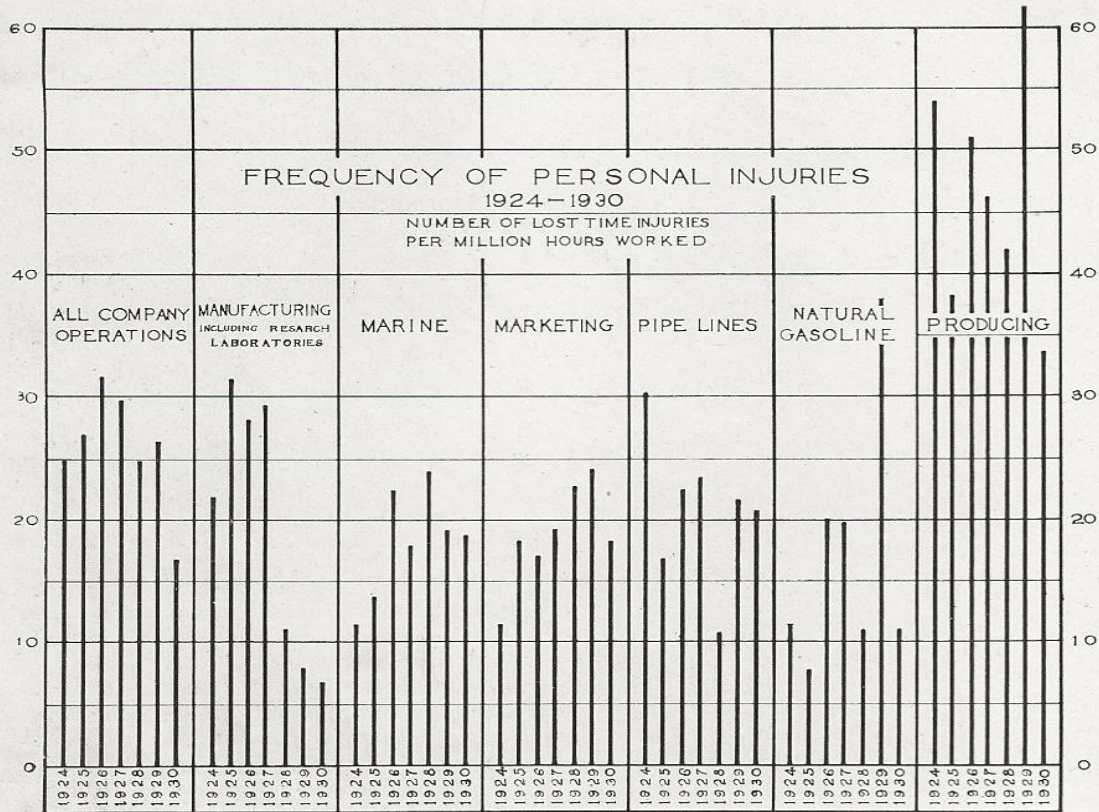
Which is the story of how the bow of a boat ran into its own stern.

SAN JOSE BASKETEERS BUSY

The Union Oil San Jose basketball team, comprised of employees in the San Jose area, is considered the "dark horse" of the Industrial League of Santa Clara County, in which play started last month.

During December and the early part of January the team, composed of Gane Eddleman, Leonard Estensen, Howard Eaton, Tony Scherer, Ed Howe, Johnny Lowe, Louis Keahey, Bill Howe and Harold Estensen, played and won a number of practice games in preparation for the opening of the Industrial League. Excluding regular tilts with the eight teams in the race for the championship, the San Jose team has also scheduled games with the Union Oilers of Salinas, Gilroy, Oleum and San Francisco.

SAFETY IN THE UNION



It is well, occasionally, to review the results obtained in any endeavor. The graphical chart of Union Oil Company's industrial accident experience, shown above, is such a review. At the left is the combined rate for the entire company, showing a marked increase for the first two years after organized accident prevention work was undertaken, and then an even greater decline, with but one small interruption, to its present frequency figure—16.8. While nationwide comparisons are not yet possible for 1930, it is of interest that in 1929 the average accident frequency in the oil industry was 27 accidents per million hours worked. In that year, only four oil companies employing more than 5000 men had achieved better records than Union Oil Company has recorded for 1930.

To the right of the company's experience are detailed the ups and downs of results in the various departments. Almost every variation in rate has behind it a story, as for instance in the Marketing group, where after five years of increase in rate, a vigorous educational safety campaign was undertaken in 1930. All departments reflect the fact that there are three distinct stages to safety work. First, the reporting of accidents must be made complete and accurate. This in itself causes an immediate ap-

parent increase in accident rate. Second, accidents must be analyzed as to cause and both management and men must learn how these basic causes can be eliminated. Finally, by education and discipline, the safe way of working must be made common practice.

There is, of course, a direct money-saving in accident prevention that justifies the large expenditure incurred in mechanical and educational safety work. A lost-time injury in the oil industry costs on the average about three hundred dollars in medical expense and compensation. Fatalities cost close to six thousand dollars. The company's reduction in lost-time injuries from 1929 to 1930 from 601 to 335 and in fatalities from 7 to 0 therefore means something financially.

But the interest of both employees and employers in accident prevention is sustained more by the altruistic desire to prevent unnecessary waste in human life and suffering. Money never paid for a serious personal injury. To the men in the offices, tankers, refineries, gas plants, drilling fields and the other almost endless ramifications of this great industry, is due great credit for the way in which they are solving one of the most distressing problems of modern life.

REFINED AND CRUDE



By RICHARD SNEDDON

A well known scientist recently traveled a hundred thousand miles to collect zoological specimens for the New York museum. Lots of American citizens travel that far during the summer vacation just to collect a few windshield stickers.

* * *

Passing through a military hospital, a visitor saw a badly wounded soldier from one of the Irish regiments.

"When are you going to send that man home?" he inquired.

"He ain't going home; he's going up to the front again," an orderly informed him.

"Up to the front!" exclaimed the visitor, "Why the man is in terrible shape."

"Yes," replied the orderly, "but he thinks he knows who done it."

—OIL BULLETIN.

* * *

A reader has written to ask if the horse power development of an automobile is entirely attributable to the use of stable gasoline. The answer is "neigh."

* * *

Some time ago a consignment of kerosene lamps was received at the Wilmington dock, from Oleum. Shortly after their arrival one of the dock hands called up Carl Brownlie, and the following conversation ensued:

Dock Hand: "You won't be able to use these kerosene lamps, Mr. Brownlie, they've all got water on them."

C. B.: "Well, can't you wipe it off?"

Dock Hand: "No, they've got thirty-five feet of water on them."

* * *

And now—a household hint: To preserve any kind of fruit, hide it away from the children.

* * *

Immense profits have been made by manufacturers of soft drinks, but statistics clearly show that no beverage sells to beat the banned.

* * *

"Was that a Jersey cow?"

"Couldn't tell you. I wasn't able to see its license."—College Humor.

An entomologist tells us that bees have from 4,900 to 13,800 eyes. That being so, why is it that the little beggars will insist on sitting down in the wrong place?

* * *

We are willing to concede that an apple a day may keep the doctor away, but ripe tomatoes are much more effective when you are dealing with book agents.

* * *

Also, if you lend your friend five dollars, and you never see him again, it is worth it.

* * *

And remember the loan shark never gets a chance to attack until you go beyond your financial depth.

* * *

"You acted like a fool when I asked you to marry me."

"I was a fool."—College Humor.

* * *

Then there was the young lady in San Luis Obispo who didn't bother to call on her sick friend, when she saw the "Notice of Improvement" pasted up on the gate post.

* * *

Bostonians are American citizens—broadly speaking.

* * *

For the social butterflies: we might mention that it is a gross breach of etiquette to break crackers or roll in your soup.

* * *

A German claims to have gone forty-four days without food. It is our opinion that he should either have given his order to another waiter, or tried a different restaurant.

* * *

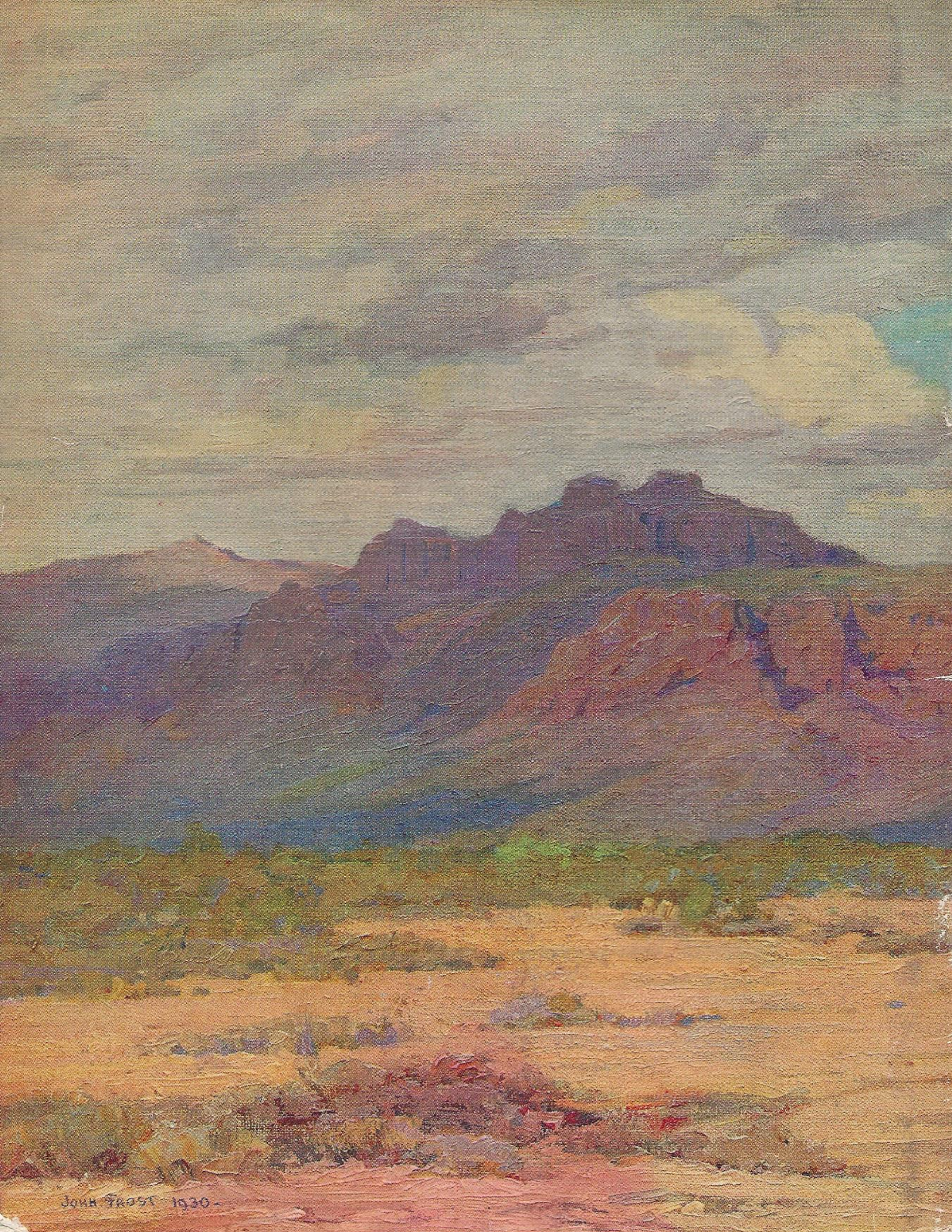
And the only man we ever knew who really cleaned up on the stock exchange was a janitor.

* * *

It is reported that eggs are used as currency in Armenia. It must be a messy job getting cigarettes out of a slot machine over there.

* * *

In conclusion we would remind you that next month we are going to repeat the aspirin story—you know, the one about the three Bayers.



JOHN FROST 1930-